Global Operations Strategy and Challenges

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Technology for Productivity

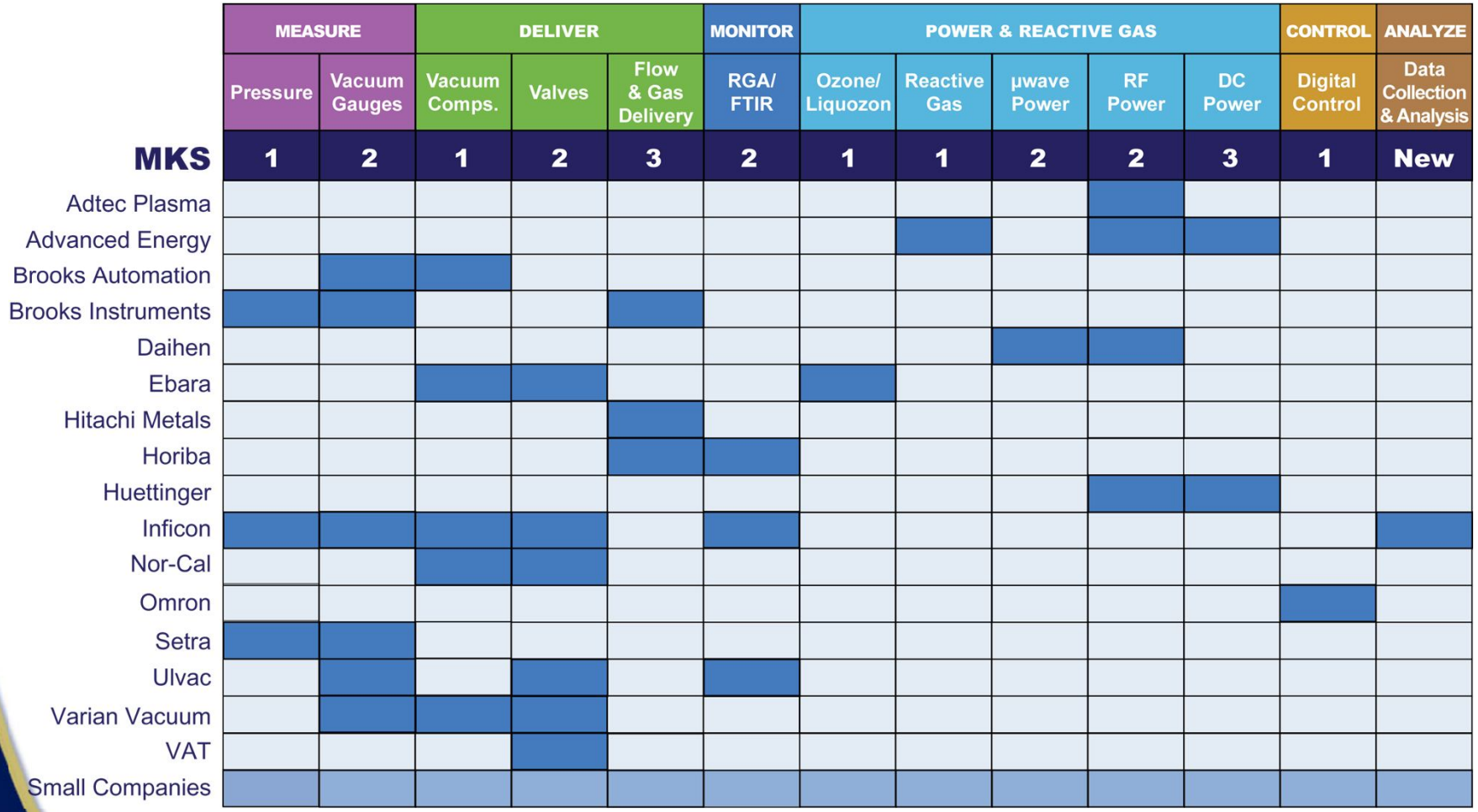
MKS Instruments, Inc.

The leading global provider of critical technologies to improve productivity in advanced, high growth markets.

Core Technologies

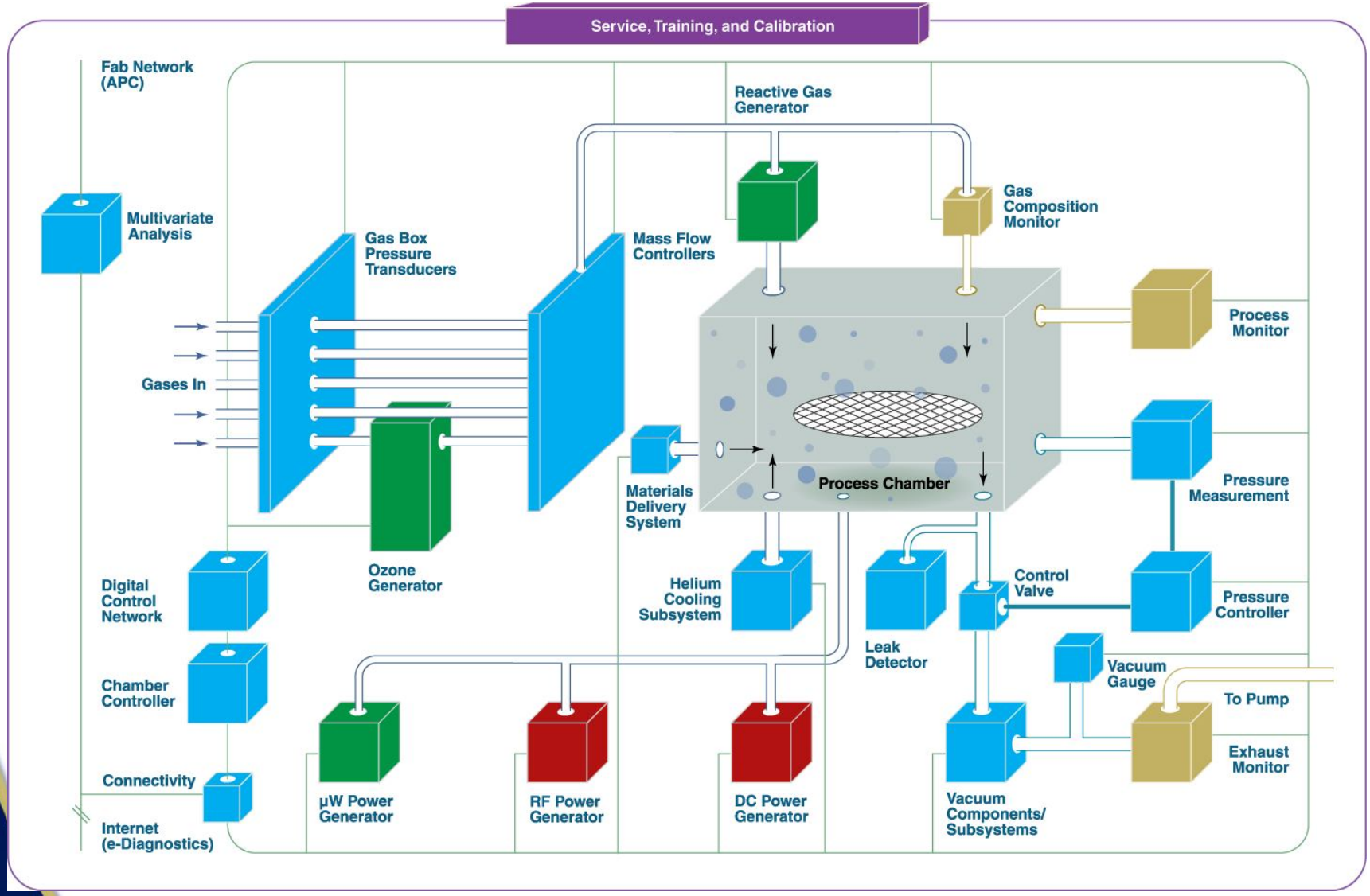
power ◆ control ◆ deliver ◆ monitor ◆ measure ◆ analyze

Broad Technology Leadership



Source: Company estimates and VLSI Research

MKS Surrounds The Process

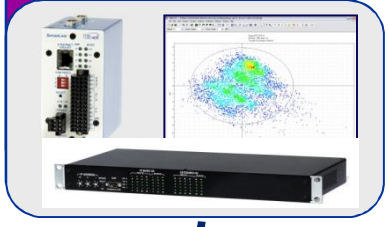


Strategy: Leverage Technologies Into High Growth Markets

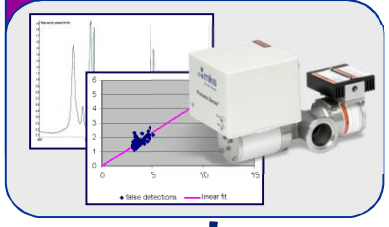
Energy & Plasma

Pressure & Flow

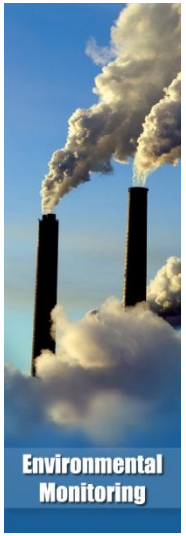
Information & Control



Composition & Analysis



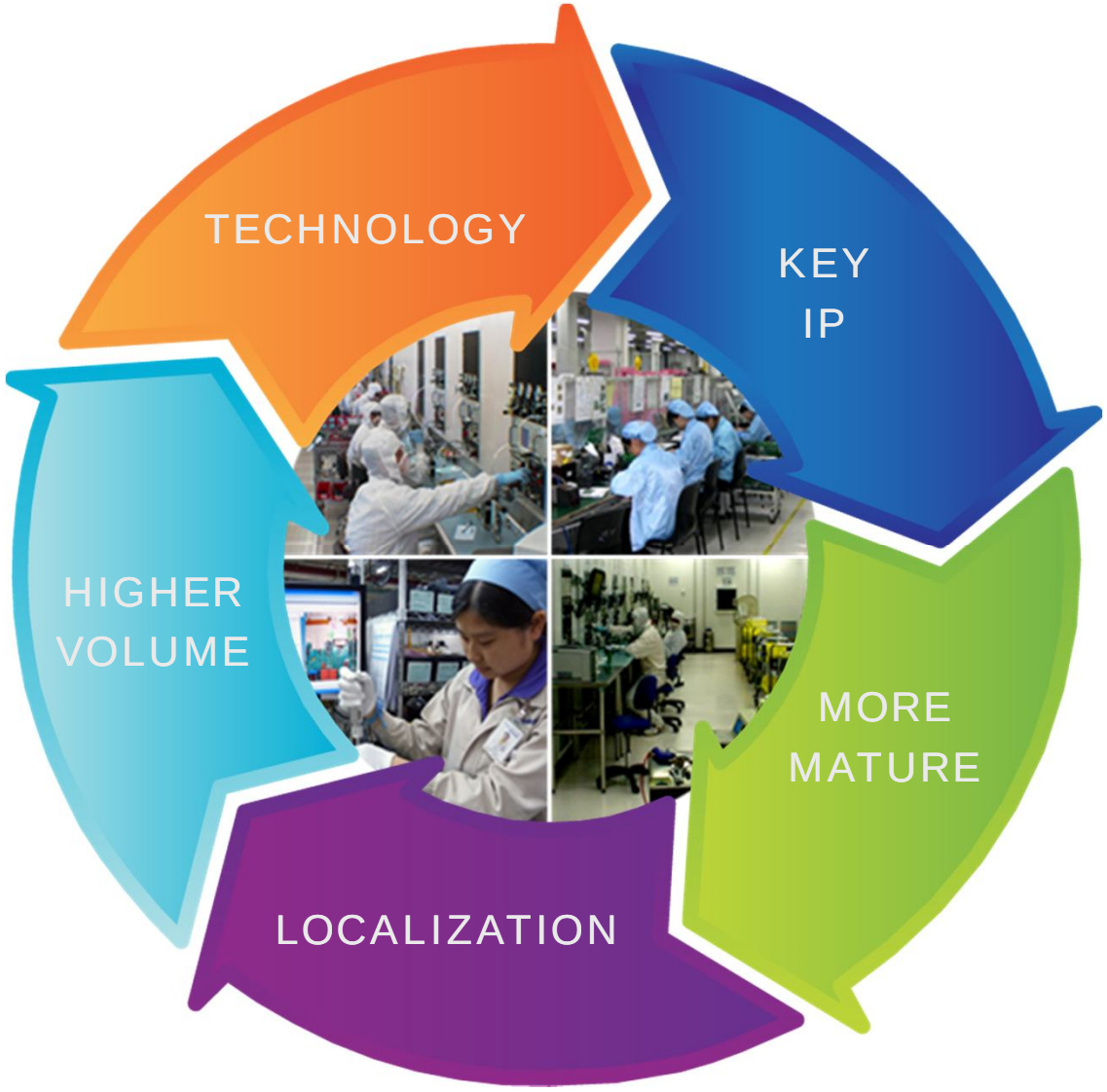
Leverage R&D investment for the semiconductor industry . . .
to serve additional advanced, high growth markets with similar process control needs



MKS' Strategic Operational Mission:

- Assist MKS in achieving a sustainable competitive advantage by developing and maintaining world class operations and supply chain management
- Attain unrivaled performance in the areas of ***quality, speed, & flexibility;*** establishing lean operations as a core competency for the company.
- Achieve world class operations execution with MA as the manufacturing hub

Global Manufacturing Strategy



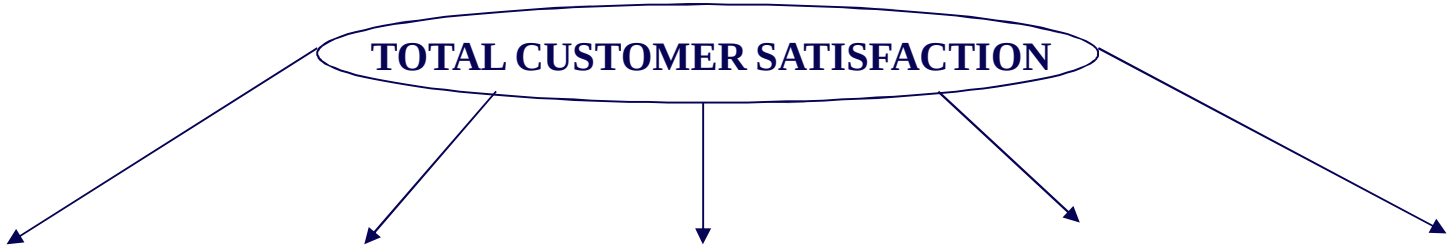
Global Strategies

- Focus on Lean Strategies to achieve Customer Satisfaction
- Develop and replicate operational best practices vs. our industry and others
- Design the global supply chain to provide optimal customer service at lowest costs
- Maximum utilization of all internal and external global resources

Key “Planks”

- Build products to “order” with short lead times
- Utilize “Lean” methodologies as our standards
- Maximize MA production content of MKS products
- Utilize LCC options if differentiation exists
- Improve and standardize best practices across MKS technical operations
- Maximize and standardize NPI to volume pipeline to MKS factories
- Standardize to best practice across other sites within product and technology parameters

Lean Operations Strategies



Forward Demand Mgt.
- Capacity/Shipment Planning
- Cross Trained Operations
- Flex Capacity/85% Load
- Shop Floor Control
- Daily Huddles
- Mgt. Contact

Yield
- Customer Awareness
- Six Sigma "Light"
- Daily Feedback
- Training
- Efficiency
- Mgt. Contact

Cycle Time Reduction
- Blitzes
- Constraint Mgt.
- 24/7 Operation
- Mgt. Contact

Supply Chain Mgt.
- Performance Measures
- Outsourcing
- Quarterly Meetings
- Supplier Business Reviews
- Mgt. Contact

Consistent Reporting
- Hoshin Goals
- Report Cards
- Load vs. Capacity
- Mgt. Contact

Key Operations Challenges

- Increased product expectations over same product platforms
- Improvement of margins with same platforms and lower pricing
- Globalizing supply chain to increase LCC spend
- Increasing flexibility in the factories
- Standardize to best practice across other sites within product and technology parameters

Operations Metrics

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Key MKS Operational Principles

- 10 - 20 day lead-times for most products
- Cycle times range from 15 minutes to 8 hours
- Target 4 inventory turns per year
- Perennial positive “PPV” performance
- Reduced IL percentage costs on higher shipment levels
- DL levels flex up and down with temporary work force channel usage

World Class Metrics

- 1st pass yield 98 - 100%
- Warranty as a % sales less than .75%
- Scrap rework costs as % sales less than 1%
- **Order Delinquency under 3% of sales**
- On time delivery 98% or better
- **Lead-time less than customer expectations**

Global Supply Chain Savings

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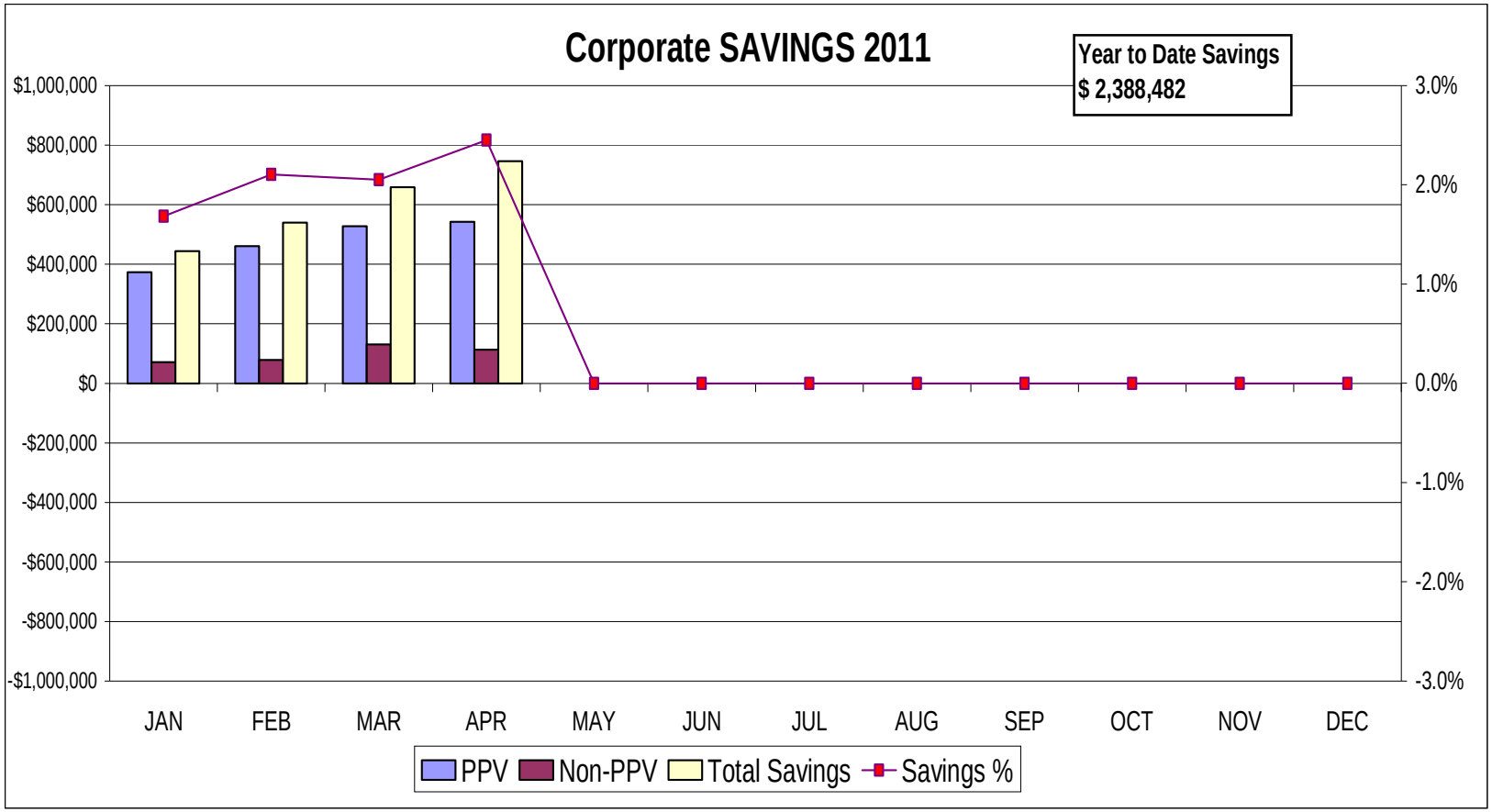

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PPV	$373,042	$461,176	$527,583	$542,614	$0	$0	$0	$0	$0	$0	$0	$0
Non-PPV	$70,795	$79,016	$130,808	$113,281	$0	$0	$0	$0	$0	$0	$0	$0
Rebates & Indirect				$90,167								
Total Savings	$443,837	$540,192	$658,391	$746,062	$0	$0	$0	$0	$0	$0	$0	$0
Savings %	1.68%	2.10%	2.05%	2.45%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total Receipts	$ 26,349,081	$ 25,669,001	$ 32,097,031	$ 30,441,542	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Quarterly 2013 Global Savings Plan vs Actual

2011 MKS Global Savings		Plan	Actual		Comments	Delta to Plan
Q1	Receipts	$68,896,000	$84,115,113			22%
	Savings	$443,038	$1,642,417			271%
	Percentage	0.64%	1.95%			204%
Q2	Receipts	$81,264,812	$30,441,542			-63%
	Savings	$2,132,687	$655,896			-69%
	Percentage	2.62%	2.15%			-18%
Q3	Receipts	$80,364,812	$0			-100%
	Savings	$2,252,687	$0			-100%
	Percentage	2.80%	#DIV/0!			#DIV/0!
Q4	Receipts	$77,364,812	$0			-100%
	Savings	$2,270,187	$0			-100%
	Percentage	2.93%	#DIV/0!			#DIV/0!
Rebates & Indirect		$ 90,166.60	$ 90,166.60			
YTD	Receipts	$95,984,271	$114,556,655			19%
	Savings	$1,153,934	$2,388,480			107%
	Percentage	1.20%	2.08%			73%
2010 Plan	Receipts	$307,890,436				
	Savings	$7,098,599				
	Percentage	2.31%				

Technical Operations Prowess a Key Operational Enabler

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Technical Operations

Mission

The Technical Operations organization will provide its customers with Best-In-Class technical services and process solutions resulting in high quality, cost effective and timely products to volume and market.

Technical Operations
2013 Key Initiatives

Equipment Support

- TPM Implementation
- Supplier Contracts
- Key Interface to Facilities
- IT Infrastructure Improvement
- Cleanroom Hygiene

Production Support

- Sustain Processes
- FPY Improvement
- Productivity Improvement
- Cycle Time Improvement
- MRB Participation
- Scrap Reduction

Advanced Mfg. Engineering

- NPI
- CTQ Definition
- Drive Lean Intiatives
- Benchmark & Develop Critical Technologies & Processes
- Standardize PDP Across MA Sites

Test Engineering

- PCBA Test:
  - ICT & Functional
- Systems Test:
  - Cal Thru Final Verification
- Reliability:
  - HALT & HASS
- Test Technology Roadmap
- Key Interface to Quality Organization for DMR Analysis & RCCA.
- Test Development Outsourcing
- SQE Interface to ECMs
  - Drive eTraveler to selected ECMs

Future Challenges

Continuous Improvement means… Continuous Change

- Overall
  - Managing rapid cultural change during dramatic business growth (need focused resources)
  - Expand Lean Activities and Training
- Lean Manufacturing Journey
  - Value Stream Mapping
  - Expanding “Standard Work” Methods development
  - Enhance “Visual Factory” Toolset
- Manufacturing
  - Expand Quality Culture across the floor (SPC)
  - Up-to-Date Documentation Availability on Demand
  - Develop workforce flexibility by cross training and certification methods
- Financials
  - Track standard costs to lower levels annually

Advanced Manufacturing Engineering (AME)

Mission

Advanced Manufacturing Engineering (AME) will provide a data driven approach to evaluate and introduce new technologies to control and improve new products and processes. The group will be responsible for Manufacturing Engineering activities during new product introduction cycles, and will drive DFX and PFMEA activities and provide resulting feedback to the development team for implementation.

Test Engineering

Mission

The pursuit of zero defects in our processes by utilizing
best-in-class test methodologies as a tools to drive process control initiatives

Key Responsibilities

- Proactively engage with Design Engineering teams to plan & implement appropriate test methodologies which will enhance manufacturing yield and product reliability
- Test development and support for NPI and sustaining activities
- Supplier technical support
- Documentation activities for existing test platforms
- Ensure that business growth is not limited by test capacity
- Define/review critical-to-quality characteristics on an ongoing basis